Network Security System

NSP-2C20

BESTEX

Always at the forefront of innovation

User Manual

Copyright

Trademarks

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FCC and DOC Statement on Class A

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio TV technician for help.

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

Warranty

1. Warranty does not cover damages or failures that are raised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subject to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

To avoid damage to the system:
• Use the correct AC input voltage range.

To reduce the risk of electric shock:
• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

Battery:
• Danger of explosion if battery incorrectly replaced.
• Replace only with the same or equivalent type recommend by the manufacturer.
• Dispose of used batteries according to local ordinance.

Before Using the System

Before using the system, prepare basic system components.

If the system comes as a barebone; that is, none of the key components, including processor, memory, and hard drive has been pre-installed as part of your purchase, you will need to at least ensure a compatible counterpart is located and installed.

You will also need a few external system peripherals intended for the use of the system, a common pool with at least a keyboard, a mouse, and a monitor is thus suggested.

Table of Content

Chapter 1

General Information

1.1 Main Feature

Processor Performance

NSP-2C20 is a 2U Rack Mount Network Security System that, pre-installed with BNX-C206 security board, featuring on Intel® C206 chipset, supports Intel® LGA1155 E3-1200 Xeon processor, and Gen-2/3 desktop Celeron®, Pentium®, Core®-i3/i5/i7 processors that carry the built-in Intel® HD Graphic engine. Below is a brief list of available processors as a quick reference:

- Celeron® Processor: G540/G1620
- Pentium® Processor: G850/G2120
- Core®-i3 Processor: i3-2120/i3-3220
- Core®-i5 Processor: i5-2400/i5-3550S
- Core®-i7 Processor: i7-2600/i7-3770
- E3-1200 Xeon Processor: E3-1225/E31275, E3-1225 V2/E3-1275 V2

8GB Memory for 64bit OS

The four Dual Channel DDR3 DIMM slots are designed to carry up to 32GB DDR3 1066/1333/1600MHz SDRAM with Non-ECC support, ideally facilitating applications that demand total memory capacity for the use of 64bit OS, beyond the 4GB barrier inherent in the 32bit OS.

Gigabit/10G LAN Ports on Expansion Module

NSP-2C20 comes with one default IO2 module that offers not only the basic system indication, USB port, and console port, but also three RJ45 Gigabit LAN ports on Intel® 82574L and two SFP Gigabit LAN ports on Intel® 82576EB. In additional to the five Gigabit LAN ports on IO2 module, two expansion slots are designed for up to two extra LAN modules. Users are encouraged to explore the different deployments using these LAN modules to achieve their demand of network port arrangement. Below is a list of all available LAN modules:

- 4-Port RJ45 Gigabit LAN Module on Intel® 82580EB
- 4-Port SFP Gigabit LAN Module on Intel® 82580EB
- 2-Port SFP+ 10G LAN Module on Intel® 82599ES

List of Key Features

- Intel® C206 Chipset
- Intel® LGA1155 Xeon E3-1200 & E3-1200 V2 Processor
- Intel® LGA1155 Gen-2/3 Desktop Celeron®, Pentium®, Core®-i3/i5/i7 Processor
- Four DDR3 RAM Slots up to 32GB
- Two internal 3.5” SATA Drive
- One CompactFlash Socket
- One SATADOM Port
- One DB15 VGA at rear side
- Two USB 2.0 Ports at front
- One RJ45 Console Port at front
- Default Three RJ45 and Two SFP Intel® Gigabit LAN Ports at front
- Two Expansion Slots for each up to additional 4-Port Gigabit or 2-Port 10G LAN Ports
- 2U 1+1 300W Redundant Power Supply
- 2U Rack Mount of 430mm Depth

1.2 Specifications

Core Engine	Chipset	Intel® C206 PCH
	Processor	Support Single Intel® E3-1200/1200 V2 Processor, Intel® Gen-2/3 Core i3, i5, i7 Processor
	Memory	4x DDR3 1066/1333 DIMM Slots, up to 32GB
	Display	CPU Integrated
Ethernet	Controller	Onboard 3x Intel® 82574L + 2x Intel® 82576EB GbE Controllers
	LAN Module	Support 2x PCIe X8 Slots for LAN Module
Storage	SATA	2x internal 3.5” SATA3 Drive Bays or 4x 2.5” SATA Drive Bays
	SATADOM	1x SATADOM Socket
	CF	1x CompactFlash Socket
Front I/O	Indication	1x Power LED, 1x HDD LED, 1x Status LED
	LAN	3x RJ45 1G Ports, 2x SFP 1G Ports
	Console	1x RJ45 Type Console Port
	USB	2x USB 2.0 Ports
Rear I/O	Switch	1x Rock Type Power Switch
	VGA	1x Optional DB15 VGA Port
Expansion	PCI	1x miniPCI Slot
Power	Type	2U 1+1 300W Redundant Power Supply, 100-240Vac, 47-63Hz
Cooling	CPU Fan	1x CPU Cooler Fan
	System Fan	2x 80mm System Fans at rear side
Other	H/W Monitoring	Monitor temperature, voltage, and fan speed, auto-throttling control at CPU overheat
Environment	Operating Temp.	0ºC ~ 40ºC
	Storage Temp.	-20ºC ~ 70ºC
	Humidity	10% ~ 90% (Non-Condensing)
Mechanical	Dimension	430mm (W) x 430mm (D) x 88mm (H)

1.3 Optional LAN Modules

BEM-C600-580-C4	Type	LAN Module
	Chipset	Intel® 82580EB
	Interface	PCIe X4
	Network Port	Four RJ45 Gigabit
	Bypass	1-Pair
BEM-C600-580-F4	Type	LAN Module
	Chipset	Intel® 82580EB
	Interface	PCIe X4
	Network Port	Four SFP Fiber Gigabit
BEM-C600-599-F2	Type	LAN Module
	Chipset	Intel® 82599ES
	Interface	PCIe X8
	Network Port	Two SFP+ 10G

1.4 System Layout

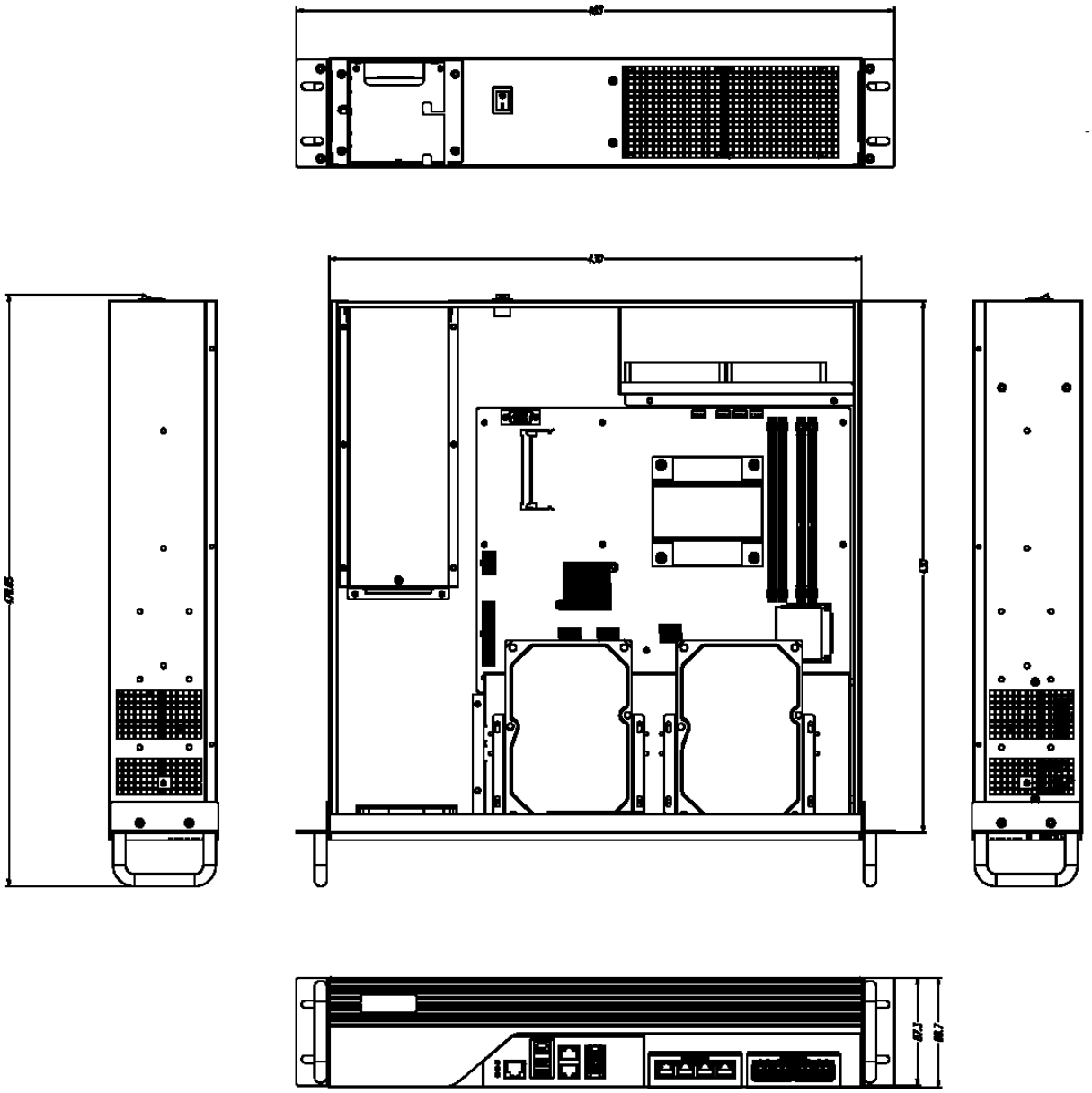
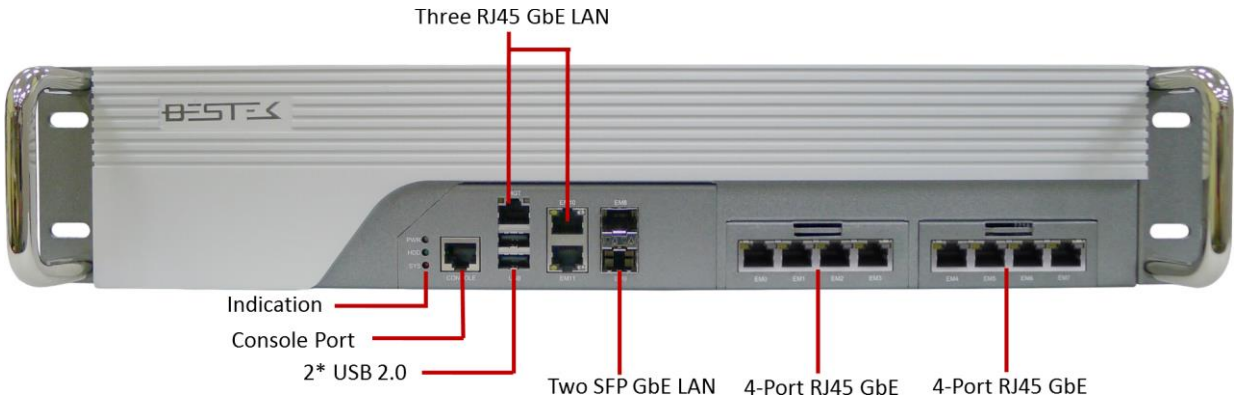


Figure 1.1: System Layout of NSP-2C20

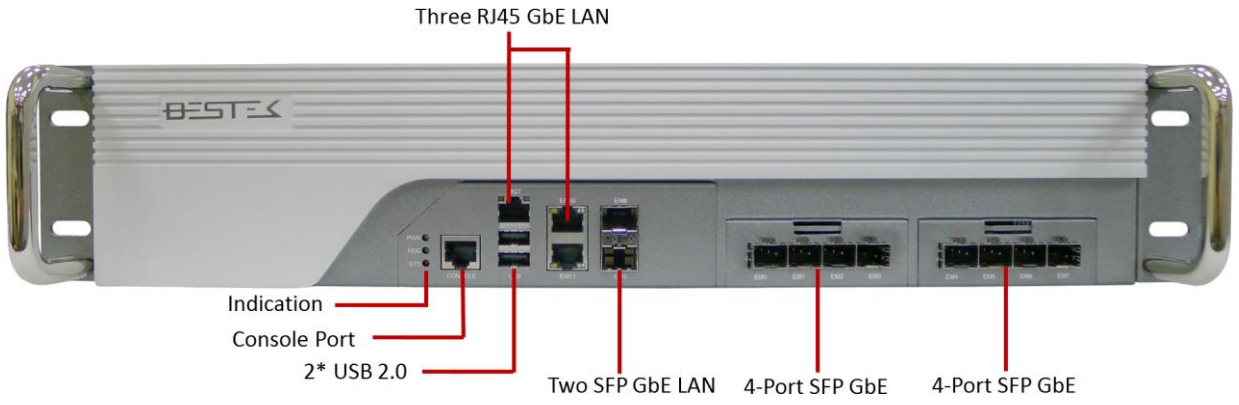
1.5 Indicators & Features

▶ Front View

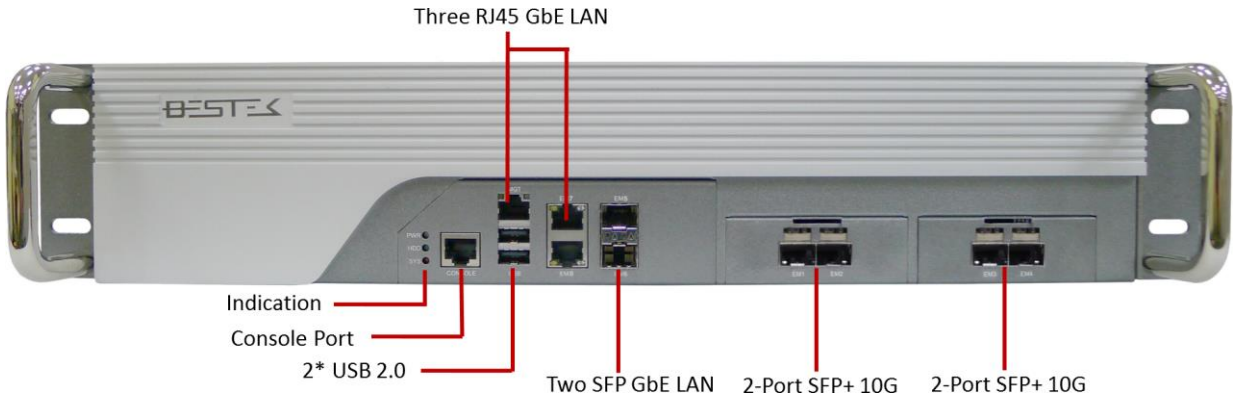
With Two 4-Port RJ45 GbE LAN Modules



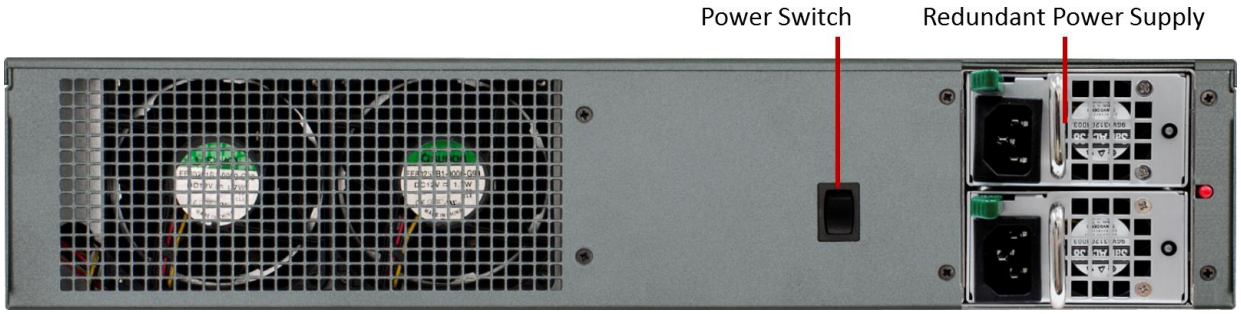
With Two 4-Port SFP GbE LAN Modules



With Two 2-Port SFP+ 10G LAN Modules



► Rear View



Chapter 2

Preparation

2.1 Before You Begin

A stable and clean working environment are essential. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A set of jewelers Screwdrivers
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

2.2 Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous. Follow the guidelines below to avoid damage to your computer or yourself:

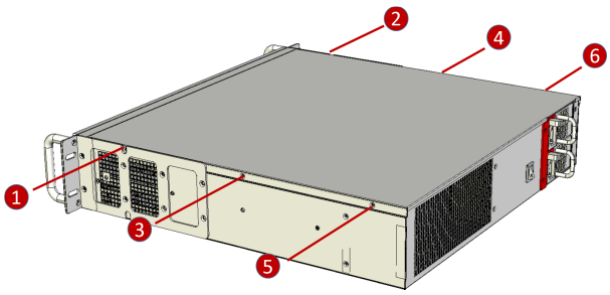
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Never touch the components on the board unless it is necessary to do so. Do not flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

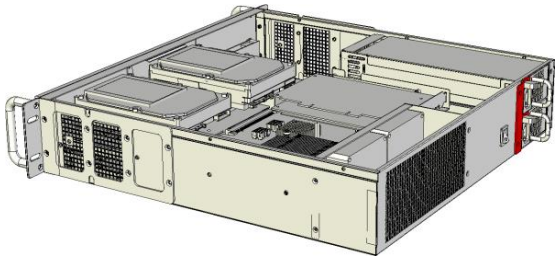
2.3 Open Up Top Cover

This is the first step of all to proceed with, if you are to install (or change) a processor (hard drive or memory module).

Please remove the 6 screws on both sides indicated in the places below, prior to any moving of the top cover. It is recommended to push the top cover backwards so as to detach the cover tongue out of the snatch-up at front side, before the lift-up or removal of the top cover.

Securing the screws is essential for they would be re-used for the restoration of the top cover, after all preparation procedures are completed.





2.4 Accessing Processor & Memory

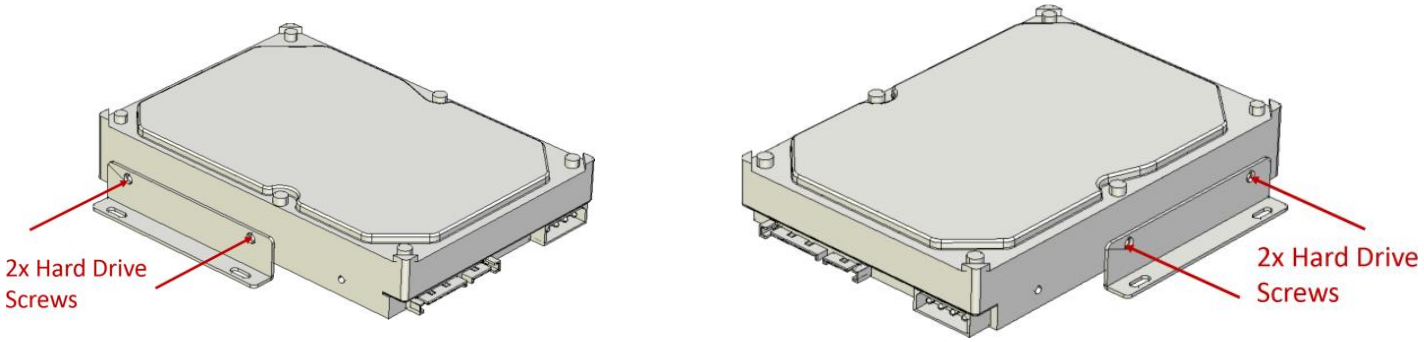
Please refer to the Manual of BNX-C206 motherboard for substantial details as to adding processor, cooler, and memory.

2.5 Adding 2.5”/3.5” SATA Hard Drive

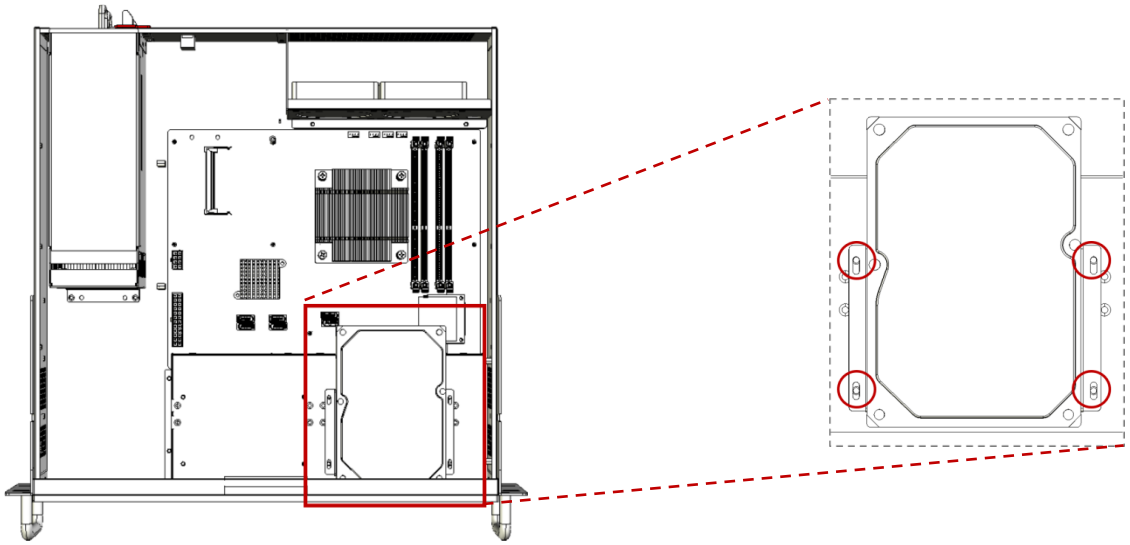
Procedures to add up to two 3.5” Hard Drives:

(1) Turn off the system and open up the top cover.

(2) Acquire the HDD bracket from the top drive bay, attach this bracket onto your 3.5” Hard Drive as indicated below so that the two furthest screw holes (from Hard Drive I/O) can be used to add screws. Please manage to add another identical bracket on the other side of your 3.5” Hard Drive, symmetrically.



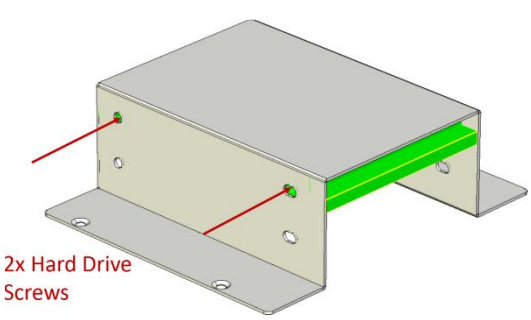
(3) Place the finished 3.5” Hard Drive subset onto the top drive bay, as indicated below (pick any drive bay from the two), so that the Hard Drive I/O is facing CPU cooler (inwardly). Add four screws to secure this subset firmly.

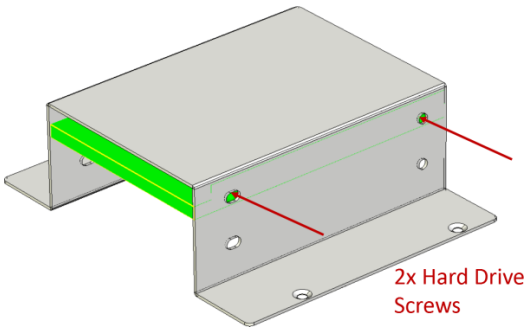


(4) Add SATA signal cable along to the motherboard, and SATA power cable from power supply to finish up the work.
(5) Please proceed to add the second 3.5” Hard Drive, if necessary, on the other available drive bay.

Procedures to add up to four 2.5” Hard Drives:

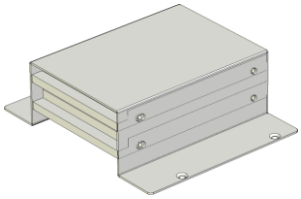
(1) Turn off the system and open up the top cover.
(2) As illustrated below, please have your first 2.5” Hard Drive assembled with the 2.5” Hard Drive holder. Add two screws on one side, and another two screws on the other side, to firmly secure this Hard Drive with the holder.



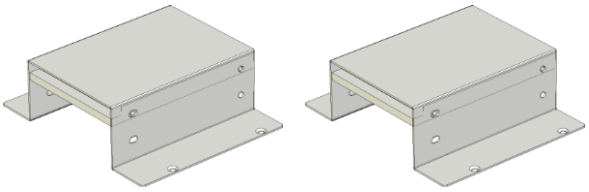


(3) In case a second Hard Drive is to be added, you have choices to add this second Hard Drive at the bottom of the first Hard Drive, or simply grab another set of Hard Drive holder and create another identical subset, ready to be attached to the top drive bay.

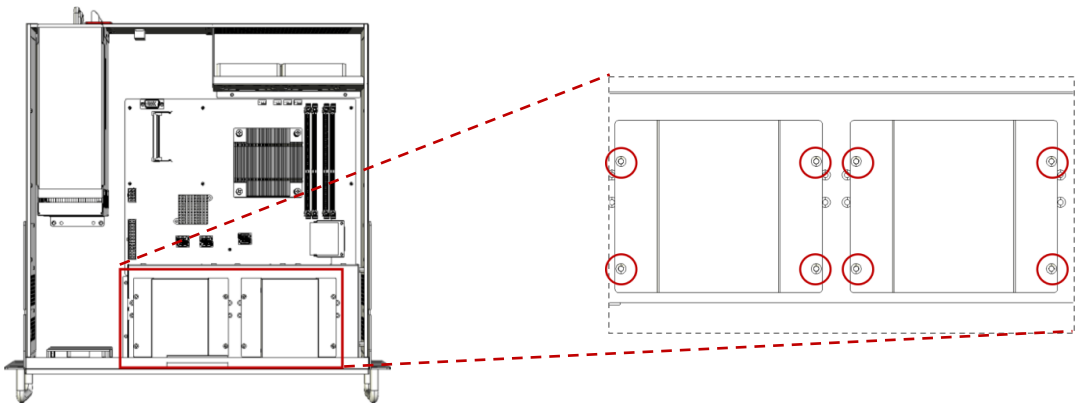
- Choice one: two drives within one holder



- Choice two: two drives within separate holders



(4) Place the finished 2.5” Hard Drive subsets onto the top drive bay, as indicated below (if using two), so that the Hard Drive I/O is facing CPU cooler (inwardly). Add eight screws to secure both subsets firmly.



(5) Add SATA signal cable along to the motherboard, and SATA power cable from power supply to finish up the work.

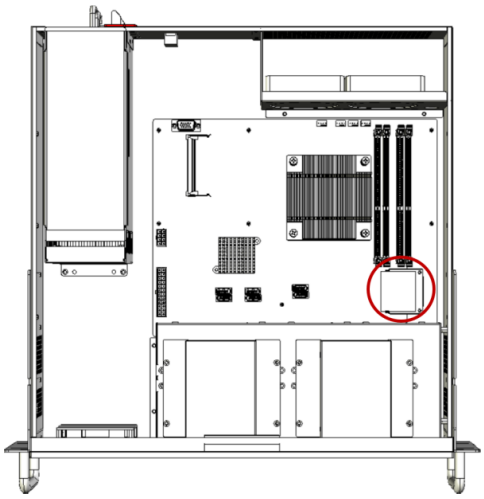
2.6 Accessing CompactFlash Card

CompactFlash instead of CFast

NSP-2C20 comes with one CompactFlash card socket, rather than CFast card socket. Please be careful when adding your flash devices.

Procedures:

(1) Turn off the system.
(2) The onboard CompactFlash socket can be located on motherboard (as the red circle).
(3) In case some difficulties are encountered at this approach, please detach the top drive bay plate before inserting, removing, or swapping a CompactFlash.
(4) Restore the top drive bay plate if removed at (3).



Please be advised that CompactFlash card on IDE interface is never to be added or removed when the system power is still turned on; that is, no plug-and-play scheme is enabled for this device. Disrespect of such a limitation would very likely lead to system instability or malfunction, or even to the worst a fatal system catastrophe. Please always turn off system power before accessing CompactFlash card.

Chapter 3

Operation

3.1 Turning On The System

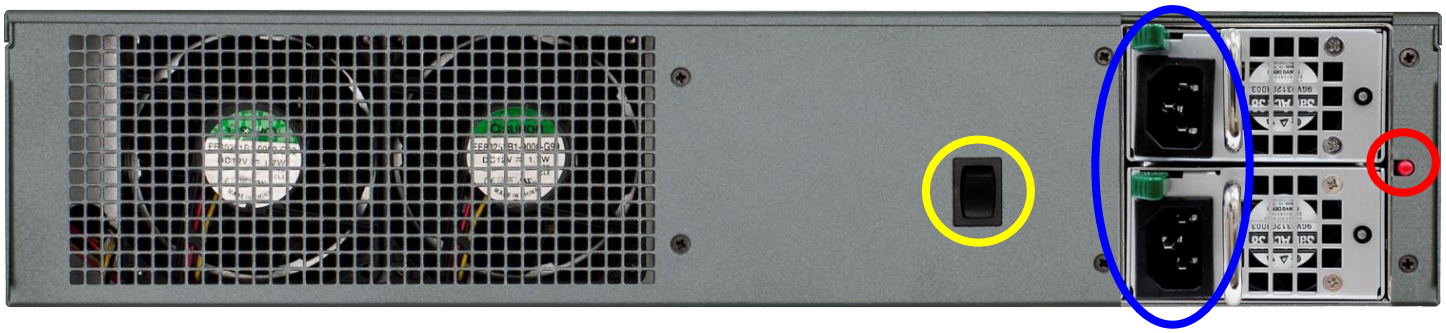
Add your cables, such as USB keyboard, USB mouse, and DB15 VGA Cable as the merest devices to control the system.

Access VGA Port

Please be noted that one DB15 VGA port is available internally on the motherboard and, however obscured by the top cover, can be accessed by opening up the top cover. Please refer to the literature of BNX-C206 Security Board for details of the VGA location. However, if user is fully geared with convenient terminal access, such a visual confirmation can be properly retrieved at console port.

Watch Input AC Power Range

Please leave the two AC power cords as the last cable to be added, right on the AC Inlet as indicated below with blue circle. The AC input range of the built-in Power Supply is 100-240Vac. If your AC input is not within this range, though rarely possible in fact, it is not compliant with the system and you should not plug in the AC power cord.



System Is Up On AC Power

In some cases, depending on whether a BIOS setting has been configured to allow immediate power-on upon the delivery of AC power, system might come right up unexpectedly for no particular reason. *Please refer to BIOS section for details with "Restore AC Power Loss"*. Have you wish to bring it down, simply press once on the power switch (located next to power supply with yellow circle), or press and hold for 4 seconds, to reach that goal. However, in most occasions, without such abrupt event as stated above, simply press once on the Power Switch to turn on the system.

Redundant Power Alarm

To start up, please make sure both power modules are firmly pushed into their positions. No alert signal should be triggered with good and healthy power modules. In case one of the power modules is not in place, out of order, or is not plugged with AC power cord, a loud alert signal (generated by power supply) will be triggered. Under such a circumstance, please press once on the "alert disable button" (located next to the power supply with red circle) to disable the annoying alert prior to any further debugging action. However, if user decides not to press this button, and would prefer proceeding with the debugging actions, such as pushing the module into position, swapping power module, or add AC power cord, the alert signal would be automatically disabled upon these action.

Power LED

The power LED can be found at front panel and shall come lit constant ON at system start.

HDD LED

The HDD LED can also be found at front panel and shall blink in the wake of storage activity, such as SATA drive or CompactFlash.

First screen & Optimal BIOS Setting

Once the system successfully boots up, it shall activate display signal on monitor, disclosing some system information as checkpoints for debugging, thereafter users are encouraged to bring up BIOS setup menu to at least load the optimal BIOS setting, as the first thing to do at power on. Please refer to the BIOS section for substantial details.

3.2 Installing Operating System & Drivers

Confirm the Hard Drive List

The system is designed to allow booting from a variety of internal devices, including USB pen drive, SATA drive, and CompactFlash drive, etc. Given the tiny footprint and slow performance of USB pen drive, SATA drive and CompactFlash are more likely the devices to carry operating system and can be found in the detected drive list, in the section of SATA Configuration.

In the event that a particular SATA device is not detected and prompted in the device list, hardly would the system boot from it. Please turn off the system, check or re-apply the SATA cable and SATA power cable, or re-insert CompactFlash card to ensure an appropriate connection.

Always Mind the SATA Mode

SATA controller is embedded in the Intel® C206 chipset, and shall run only in one single SATA mode at a time. Three different modes are available: IDE, AHCI, and RAID. Please ensure that a SATA mode has been selected for the installation, and always use this particular mode to boot the operating system installed on that SATA mode. Failed to boot the operating system with the correct SATA mode would very probably run into system collapse. While thus disaster occurs, please re-select a SATA mode to try again the advisability of such change, so as to recollect the mode being used at the installation phase.

Procedures to load operating system:

(1) Please attach USB CD-ROM or DVD-ROM drive.
(2) Start or restart the system.
(3) Press “del” to go to BIOS setup menu.
(4) Choose to confirm SATA Controller status. If it is enabled, select a SATA mode and go to (6).
(5) If SATA Controller is disabled, bring it up and reboot to allow a re-detection of Hard Drives.
(6) Confirm if the Hard Drive has been detected by the prompt of it on the drive list.
(7) Scroll and choose to boot from optical device (CD-ROM or DVD-ROM).
(8) Save and reboot the system to activate the change and start the installation.
(9) Upon reception of messages or instruction from Operating System CD or DVD, please proceed with the rest of the work as installer instructs.

Loading Extra Driver Files

Some challenges might occur during the installation, such as “no Hard Drive detected”, where extra driver files are needed. This is mostly found, when AHCI or RAID mode are selected, in operating systems such as Windows-XP, where a USB floppy drive loaded with SATA driver should be prepared and attached on USB port and, at the prompt of such a message, please press “F6” key while being asked to do so, to allow the installer integrate the driver file from floppy drive. Windows-7 or above apparently do not seem to come with such an issue against the onboard Intel® C206 SATA Controller, and hence no extra driver should be needed.

On completion of the installation of operating system such as Microsoft Windows, please find the driver CD in the enclosed accessory bag and proceed with driver files installation in the sequence as: INF (Chipset), VGA, and LAN. If some driver updates are available by Windows Update, please accept the updates when prompted.

3.3 Understanding LAN Indicators

Activity LED

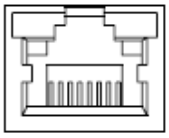
The left LED is LAN Port Activity LED, with three different indication status:

(1) Constant Yellow: Network is connected.
(2) Blinking Yellow: Network activity is on-going.
(3) Off: Network is not connected.

LAN Speed LED

The right LED is LAN Port Speed LED, with three different speeds:

(1) Amber: 1000 Speed
(2) Green: 100 Speed
(3) Off: 10 Speed.



Summary Table

LED	Color	State	Description
RJ45 NIC Linkage (Left Side)	Yellow	On	LAN linked
	Yellow	Blinking	LAN accessing
	Off	Off	No LAN linked
RJ45 NIC Mode (Right Side)	Amber	On	Gigabit mode
	Green	On	100M mode
	Off	Off	10M mode

Chapter 4

BIOS Setup

About the BIOS

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters. These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values stored in CMOS.

With easy-to-use pull down menus, you can configure such items as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

When to Run BIOS

This program should be executed under the following conditions:

- When changing the system configurations.
- When a configuration error is detected by the system and you are prompted to make changes to the Setup program.
- When resetting the system clock.
- When setting the CPU clock speed so that it automatically runs either fast or slow.
- When redefining the communication ports to prevent any conflicts.
- When making changes to the Power Management configuration.
- When changing the password or making other changes to the security setup.

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM loses power, or when the system features need to be changed.

When to Update BIOS

In the event that new features are released and a BIOS update is required, you will need to update your BIOS on your own, with the help of an appropriate guide, a reference tool, and some command files for the job.

Please seek for help from your local dealer, or send your request to our technical support department.

4.1 Entering Setup

When the system is powered on, the BIOS will initiate the Power-On-Self-Test (POST) routines. These routines perform various diagnostic checks. If an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <**Del**> allows you to enter Setup. Another way to enter Setup is to power on the computer and wait for the following message during the POST:

TO ENTER SETUP BEFORE BOOT
PRESS <CTRL-ALT-ESC> OR <DEL> KEY

Press the <**Del**> key or press the <**Ctrl**>, <**Alt**>, and <**Esc**> keys to enter Setup.

4.2 Getting Help

The online description of the highlighted setup item is displayed at the right pane of the menu at all time. Press F1 to pop up a small help window that lists all the function keys and its use.

To exit the Help Window, press **<F1>** or **<Esc>.**

4.3 Control Keys

The table below lists all the function keys for the navigation in the BIOS setup menu.

Function Key	**Description**
Up/Down Arrow Key	Move Up/Down
Left/Right Arrow Key	Move Left/Right
Enter Key	Select
+/- Key	Change value
ESC	Exit
Tab	Select a Field
F1	General Help
F4	Save & Exit

To exit the Help Window, press **<F1>** or **<Esc>.**

4.4 The Main Menu

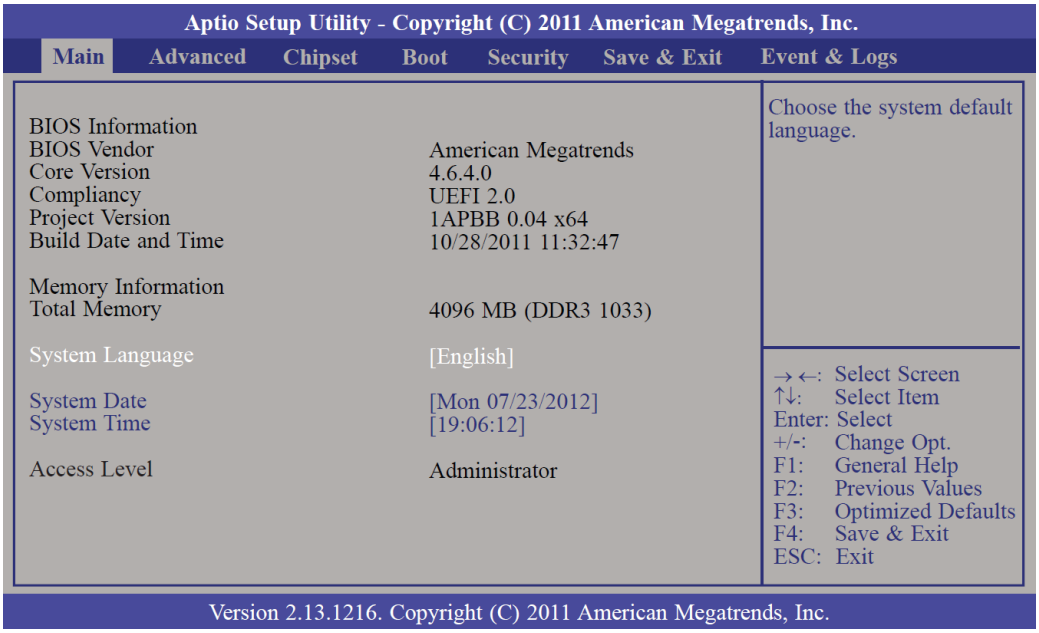


Figure 4-1: BIOS Setup Utility Main Menu

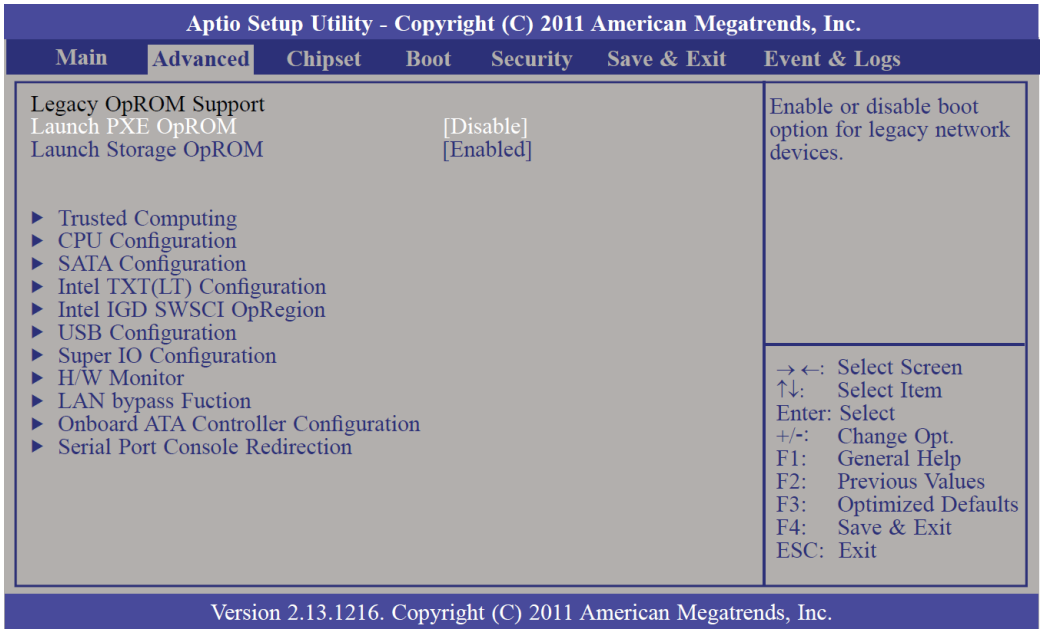
The menu bar on the top of the first screen has the following submenus:

- **Main:** Basic system configuration.
- **Advanced:** Advanced system settings.
- **Chipset:** Other functions.
- **Boot:** System boot configuration.
- **Security:** Configure Supervisor and User Password
- **Save & Exit:** Exit options as well as loading optimal defaults
- **Event & Logs:** Store system events, such as chassis intrusion and power loss, etc.

System Time [xx:xx:xx]: Set the system time.
System Date [Day xx/xx/xxxx]: Set the system date.

4.5 The Advanced Menu

In this section, you may set the configurations for the following items: Trusted Computing, CPU Configuration, SATA Configuration, USB Configuration, Super IO Configuration, H/W Monitor, LAN Bypass Function, and Serial Port Console Redirection.



Launch PXE OpROM

Enable or disable boot options for legacy network devices.

Launch Storage OpROM

Enable or disable boot option for legacy mass storage devices with OpROM

CPU Configuration

Limit CPUID Maximum

It is designed to limit the listed speed of the processor to older operating systems.

SATA Configuration

SATA Mode

- *IDE Mode:* This option configures the Serial ATA drives as Parallel ATA storage devices.
- *AHCI Mode:* This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).
- *RAID Mode:* This option allows you to create RAID or Intel Matrix Storage configuration on Serial ATA devices.

Serial ATA Controller 0-1

This option allows you to Enable/Disabled Serial ATA Controller 0-1.

If AHCI or RAID mode is selected, all detected SATA Hard Drives will be prompted on the list.

USB Configuration

Legacy USB Support

- *Enabled:* Enables legacy USB.
- *Auto:* Disables support for legacy when no USB devices are connected.
- *Disabled: Keep USB devices available only for EFI applications.*

EHCI Hand-off

This is a workaround for OSes that does not support EHCI hand-off. The EHCI ownership change should be claimed by the EHCI driver.

Port 60/64 Emulation

Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.

Super IO Configuration

Restore AC Power Loss

- *Off:* When power returns after an AC power failure, the system's power is off. You must press the Power button to power-on the system.
- *On:* When power returns after an AC power failure, the system will automatically power-on.
- *Last State:* When power returns after an AC power failure, the system will return to the state where you left off before power failure occurs. If the system's power is off when AC power failure occurs, it will remain off when power returns. If the system's power is on when AC power failure occurs, the system will power-on when power returns.

WatchDog Timer

This is used to select the time interval of the Watchdog timer. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

Serial Port 0/1 Configuration

Serial Port

Enables or disables the serial port.

Change Settings

Selects the IO/IRQ setting of the I/O device.

Parallel Port Configuration

Parallel Port

Enables or disables the Parallel port.

Change Settings

Selects the IO/IRQ setting of the I/O device.

Device Mode

Change the printer port mode.

LAN Bypass Function

LAN Group1 Power ON and LAN Group2 Power ON

The options are Pass Through and Bypass.

LAN Group1 Power OFF and LAN Group2 Power OFF

The options are Pass Through and Bypass.

WDT

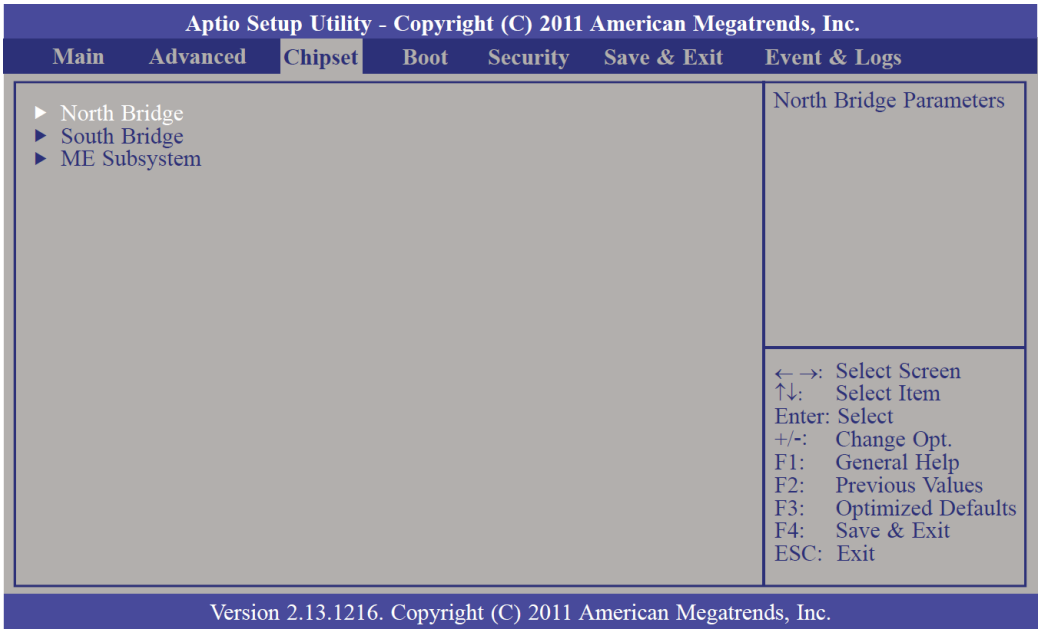
This is used to enable or disable the Watchdog Timer function.

Serial Port Console Redirection

Console Redirection

Enables or disables Console Redirection function of each Serial Port.

4.6 The Chipset Menu



North Bridge

IGD Memory

Selects the internal graphics device's shared memory size.

South Bridge

Wake on LAN from S5

When enabled, it allows the system to wake from S5 via the network port.

After G3

Power Off / WOL

Power-on the system via WOL after G3.

Power On

Power-on the system after G3.

USB Configuration

All USB Devices

Enables or disables all USB devices.

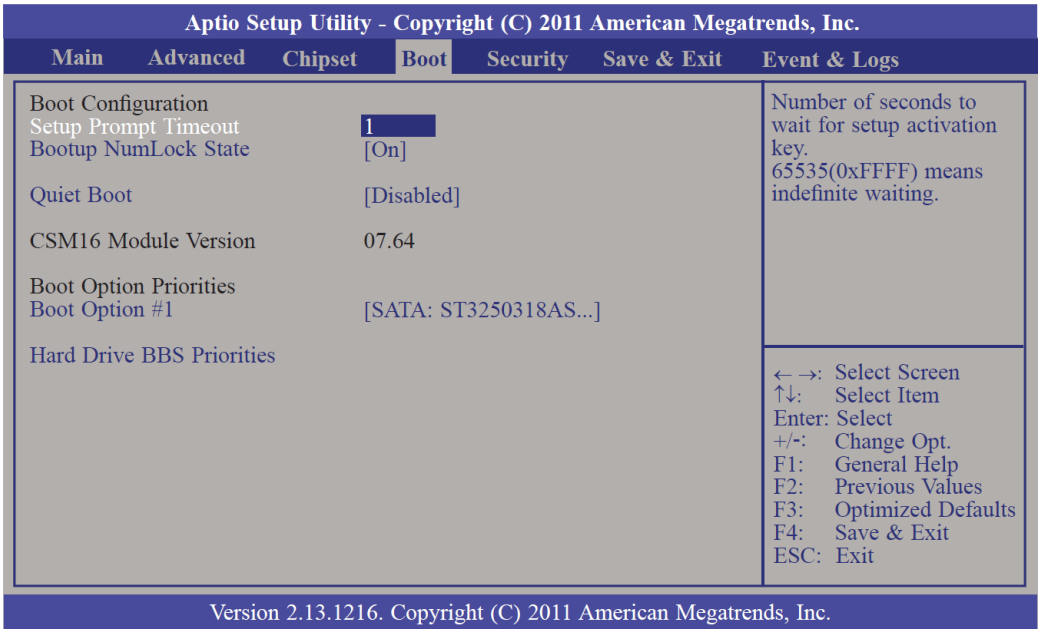
EHCI Controller 1 and EHCI Controller 2

These are used to enable or disable Enhanced Host Controller Interface (USB 2.0).

USB Port 0 to USB Port 5

Enables or disables the selected USB port.

4.7 The Boot Menu



Bootup NumLock State

This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

Quiet Boot

This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo.

- When it is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.
- When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.

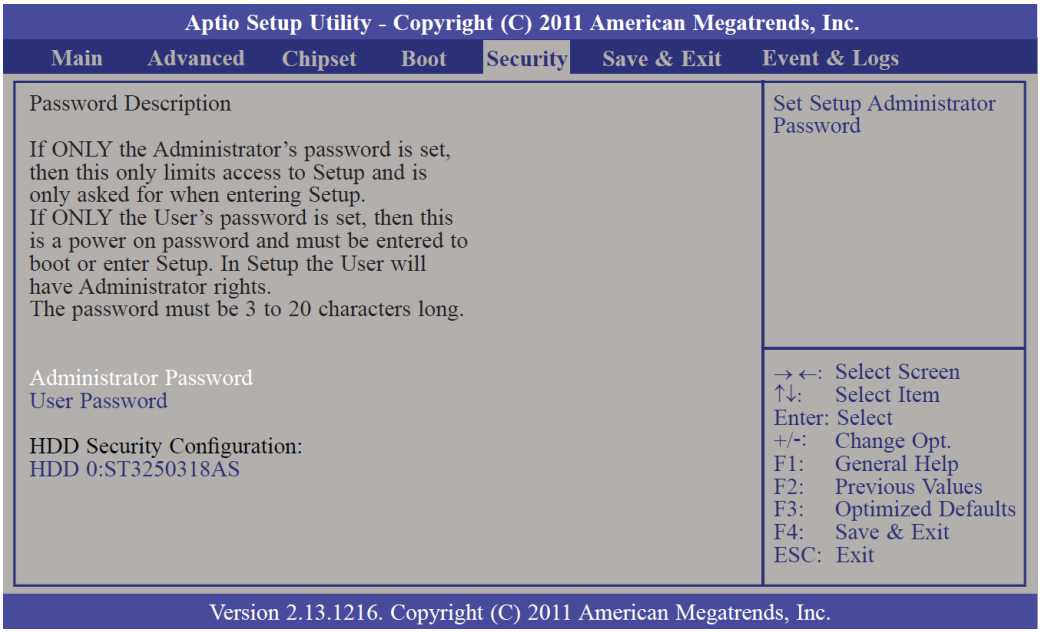
Boot Option Priorities

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. First press <Enter> to enter the sub-menu. Then you may use the arrow keys (↑↓) to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

Hard Drive BBS Priorities

This setting allows users to set the Hard Drive boot sequence.

4.8 The Security Menu



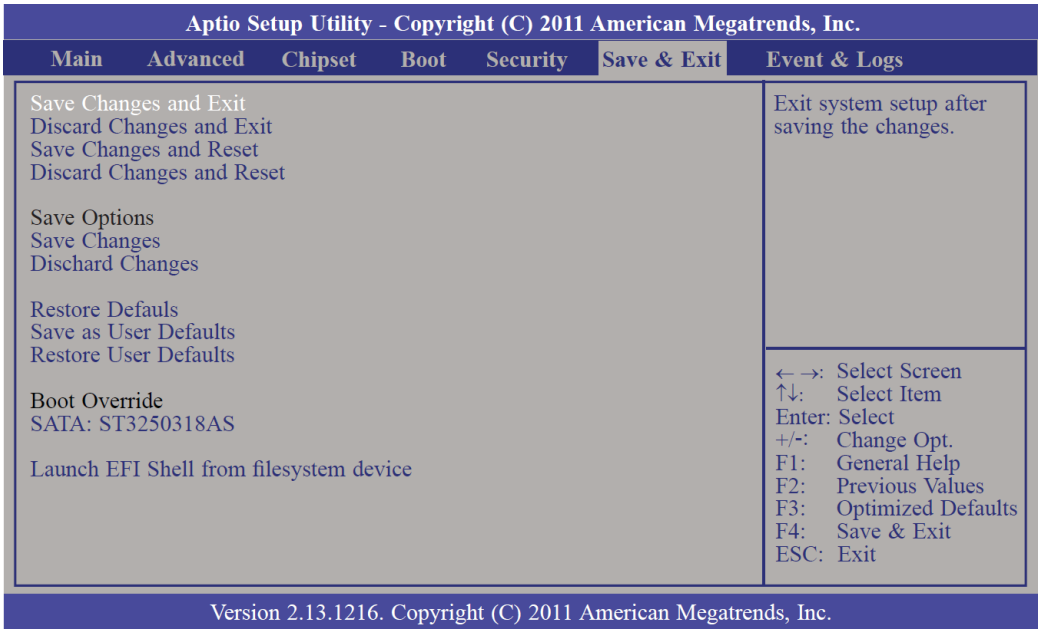
Administrator Password

Administrator Password controls access to the BIOS Setup utility. Users will be prompted for Administrator password only when they enter BIOS Setup.

User Password

User Password controls access to the system at boot and access to the BIOS Setup utility. Users will be prompted for User password when they power on the system or enter BIOS Setup. In BIOS Setup, users will have Administrator rights.

4.9 The Save & Exit Menu



Discard Changes and Exit

To exit the Setup utility without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting.

You can also press <ESC> to exit without saving the changes.

Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Save Changes

Save changes done so far to any of the setup options.

Dischard Changes

To discard the changes, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes to discard all changes made and restore the previously saved settings.

You can also press <F7> to discard the changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

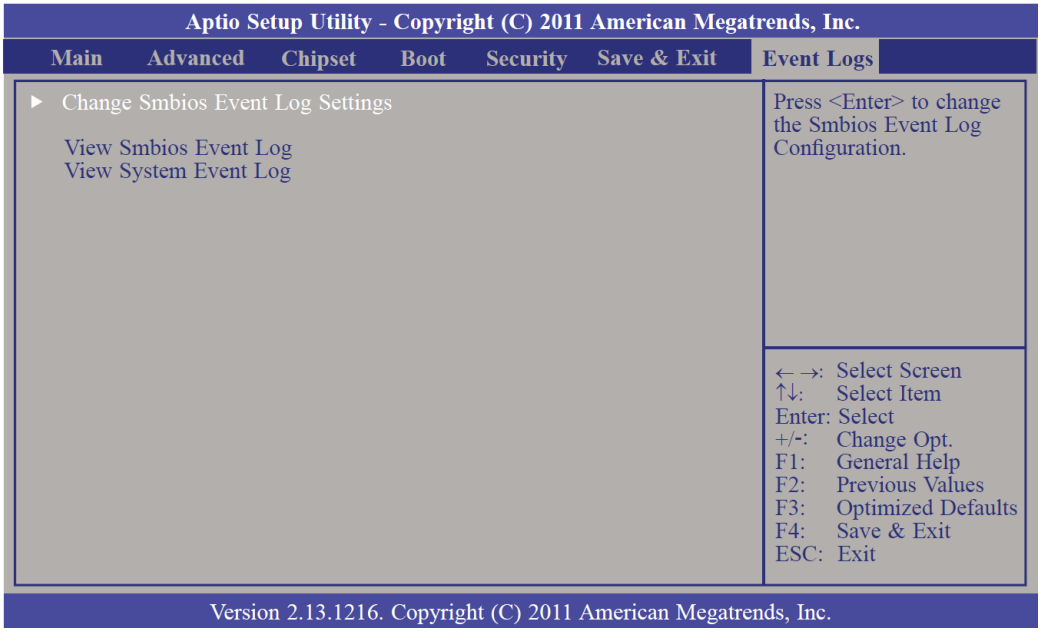
Save as User Defaults

To save changes done so far as user default, select this field and then press <Enter>. A dialog box will appear. Select Yes to save values as user default.

Restore User Defaults

To restore user default to all the setup options, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore user default.

4.10 Event Logs



View Smbios Event Log

To view Smbios event log.

View System Event Log

To view system event log.

Change Smbios Event Log Settings

Erase Event Log

Choose options for erasing Smbios event log. Erasing is done prior to any logging activation during reset.

When Log is Full

Choose options for reactions to a full Smbios event log.

MECI

Multi Event Count Increment: The number of occurrences of a duplicate event that must pass before the multiple-event counter associated with the log entry is updated, specified as a numeric value in the range of 1 to 255.

METW

Multi Event Time Window: The number of minutes which must pass between duplicate log entries which utilize a multiple-event counter. The value ranges from 0 to 99.

Log OEM Codes

Enable or disable the logging of EFI Status codes as OEM codes (if not already converted to legacy)

Convert OEM Codes

Enable or disable the converting of EFI Status Codes to Standard Smbios Types (Not all may be translated).

Chapter 5

Programming Guide

5.1 LAN Status Sample Code

```
#include <stdio.h>

//---------------------------------------------------------------------

//CMOS Port Address
#define CMOS_INDX_PORT    0x70
#define CMOS_DATA_PORT    0x71

//LAN Status Flag Address
#define  LAN_STATUS_FLAG1   Ox55
#define  LAN_STATUS_FLAG2   Ox56

//LAN Status Flag Definition
#define LAN1_PWRON_FLAG    0x00
#define LAN1_PWROFF_FLAG   0x01
#define LAN2_PWRON_FLAG    0x02
#define LAN2_PWROFF_FLAG   0x03
#define LAN_WDT_FLAG       0x04
#define LAN3_PWRON_FLAG    0x05
#define LAN3_PWROFF_FLAG   0x06
#define LAN4_PWRON_FLAG    0x00
#define LAN4_PWROFF_FLAG   0x01
//---------------------------------------------------------------------
void GpioInit(void);
void GpioOut(char, char);
void SetBit(char*, char);
void ClrBit(char*, char);
char GetBit(char Data, char Bit);
//---------------------------------------------------------------------
main(void)
{
char data1, data2;
char  *BP  = "ByPass";
char  *PT  = "PassThrough";
char  *RST = "Reset";
```

```
char LAN1PowerON[15], LAN1PowerOFF[15], LAN2PowerON[15], LAN2PowerOFF[15];
char LAN3PowerON[15], LAN3PowerOFF[15], LAN4PowerON[15], LAN4PowerOFF[15];
char WDT[15];

outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG1);
data1 = inportb(CMOS_DATA_PORT);
outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG2);
data2 = inportb(CMOS_DATA_PORT);
if(GetBit(data1, LAN1_PWRON_FLAG))        strcpy(Lan1PowerON, BP);
else                                      strcpy(Lan1PowerON, PT);
if(GetBit(data1, LAN1_PWROFF_FLAG))       strcpy(Lan1PowerOFF, BP);
else                                      strcpy(Lan1PowerOFF, PT);
if(GetBit(data1, LAN2_PWRON_FLAG))        strcpy(Lan2PowerON, BP);
else                                      strcpy(Lan2PowerON, PT);
if(GetBit(data1, LAN2_PWROFF_FLAG))       strcpy(Lan2PowerOFF, BP);
else                                      strcpy(Lan2PowerOFF, PT);
if(GetBit(data1, LAN_WDT_FLAG))           strcpy(WDT, BP);
else                                      strcpy(WDT, Rst);
if(GetBit(data1, LAN3_PWRON_FLAG))        strcpy(Lan3PowerON, BP);
else                                      strcpy(Lan3PowerON, PT);
if(GetBit(data1, LAN3_PWROFF_FLAG))       strcpy(Lan3PowerOFF, BP);
else                                      strcpy(Lan3PowerOFF, PT);
if(GetBit(data2, LAN4_PWRON_FLAG))        strcpy(Lan4PowerON, BP);
else                                      strcpy(Lan4PowerON, PT);
if(GetBit(data2, LAN4_PWROFF_FLAG))       strcpy(Lan4PowerOFF, BP);
else                                      strcpy(Lan4PowerOFF, PT);

printf("[LAN 1]\n")
printf("POWER ON:%s\n", LAN1PowerON);
printf("POWER OFF:%s\n", LAN1PowerOFF);
printf("[LAN 2]\n")
printf("POWER ON:%s\n", LAN2PowerON);
printf("POWER OFF:%s\n", LAN2PowerOFF);
printf("[LAN 3]\n")
printf("POWER ON:%s\n", LAN3PowerON);
printf("POWER OFF:%s\n", LAN3PowerOFF);
printf("[LAN 4]\n")
printf("POWER ON:%s\n", LAN4PowerON);
```

```
printf("POWER OFF:%s\n", LAN4PowerOFF);
printf("[WDT]\n")
printf("WDT Event:%s\n", WDT);

return;
}
//---------------------------------------------------------------------------
void SetBit(char *Data, char Bit)
{
switch(Bit)
{
    switch(Bit)
    {
        case 0:
                  *Data |= 0x01;
                  break;
        case 1:
                  *Data |= 0x02;
                  break;
        case 2:
                  *Data |= 0x04;
                  break;
        case 3:
                  *Data |= 0x08;
                  break;
        case 4:
                  *Data |= 0x10;
                  break;
        case 5:
                  *Data |= 0x20;
                  break;
        case 6:
                  *Data |= 0x40;
                  break;
        case 7:
                  *Data |= 0x80;
                  break;
    }
}
```

```
void ClrBit(char *Data, char Bit)
{
    switch(Bit)
    {

        case 0:
                  *Data &= 0xFE;
                  break;
        case 1:
                  *Data &= 0xFD;
                  break;
        case 2:
                  *Data &= 0xFB;
                  break;
        case 3:
                  *Data &= 0xF7;
                  break;
        case 4:
                  *Data &= 0xEF;
                  break;
        case 5:
                  *Data &= 0xDF;
                  break;
        case 6:
                  *Data &= 0xBF;
                  break;
        case 7:
                  *Data &= 0x7F;
                  break;
    }
}

//---------------------------------------------------------------------------

char GetBit(char Data, char Bit)
{
    switch(Bit)
    {
```

```
        case 0:
                    *Data &= 0x01;
                    break;
        case 1:
                    *Data &= 0x02;
                    break;
        case 2:
                    *Data &= 0x04;
                    break;
        case 3:
                    *Data &= 0x08;
                    break;
        case 4:
                    *Data &= 0x10;
                    break;
        case 5:
                    *Data &= 0x20;
                    break;
        case 6:
                    *Data &= 0x40;
                    break;
        case 7:
                    *Data &= 0x80;
                    break;
    }
    if (data == 0)   return 0;
    else             return 1;
}
//---------------------------------------------------------------------------
```

5.2 LAN Switch Sample Code

```
#include <stdio.h>

//---------------------------------------------------------------------------

//LPC Port Address
#define ADDR_PORT         0x2E
#define DATA_PORT         0x2F

//GPIO Pin Definition
#define LAN_LOCK          0x04
#define LAN_COMMAND       0x07
#define LAN_PWRON         0x01
#define LAN_PWROFF        0x05
#define LAN_WDT           0x06

//CMOS Port Address
#define CMOS_INDX_PORT    0x70
#define CMOS_DATA_PORT    0x71

//LAN Status Flag Address
#define LAN_STATUS_FLAG1  0x55
#define LAN_STATUS_FLAG2  0x56

//LAN Status Flag Definition
#define LAN1_PWRON_FLAG   0x00
#define LAN1_PWROFF_FLAG  0x01
#define LAN2_PWRON_FLAG   0x02
#define LAN2_PWROFF_FLAG  0x03
#define LAN_WDT_FLAG      0x04
#define LAN3_PWRON_FLAG   0x055
#define LAN3_PWROFF_FLAG  0x06
#define LAN4_PWRON_FLAG   0x00
#define LAN4_PWROFF_FLAG  0x01
//---------------------------------------------------------------------------
void GpioInit(void);
void GpioOut(char, char);
```

```
void SetBit(char*, char);
void ClrBit(char*, char);
void SetStatusFlag(char, char, char, char);
//---------------------------------------------------------------------------
main(int argc, char *argv[])
{
int PairSel, PowerOn, PowerOff, WDT;

if(argc == 5)
{
       PairSel    = strtol(argv[1], NULL, 16);
       PowerOn    = strtol(argv[2], NULL, 16);
       PowerOff   = strtol(argv[3], NULL, 16);
       WDT        = strtol(argv[4], NULL, 16);
}
else
{
       printf("Command Error!!\n");
       return;
}
//Init GPIO
GpioInit();
GpioOut(LAN_LOCK, 0);
GpioOut(LAN_COMMAND, 0);

//Command Start: Set LAN_LOCK pin to high level
GpioOut(LAN_LOCK, 1);
delay(1);

//ByPass/PassThough Setting
//Set High/Low level to corresponding pins
// High => Bypass
// Low => PassThrough
GpioOut(LAN_PWRON, PowerOn);
GpioOut(LAN_PWROFF, PowerOff);
GpioOut(LAN_WDT, WDT);

//LAN Pair Selection
//Generate N pulses to select the Nth LAN pair
```

```
switch(PairSel)
{
    case 1:   GpioOut(LAN_COMMAND, 1);//            ____
              delay(1);//                        __|1ms|__
              break;

    case 2:   GpioOut(LAN_COMMAND, 1);
              delay(1);
              GpioOut(LAN_COMMAND, 0);
              delay(1);
              GpioOut(LAN_COMMAND, 1);//            ____   ___
              delay(1);//                        __|1ms|__|1ms|__
              break;

    case 3:   GpioOut(LAN_COMMAND, 1);
              delay(1);
              GpioOut(LAN_COMMAND, 0);
              delay(1);
              GpioOut(LAN_COMMAND, 1);
              delay(1);
              GpioOut(LAN_COMMAND, 0);
              delay(1);
              GpioOut(LAN_COMMAND, 1);//     ____   ___   ____
              delay(1);//                  __|1ms|__|1ms|__|1ms|__
              break;

    case 4:   GpioOut(LAN_COMMAND, 1);
              delay(1);
              GpioOut(LAN_COMMAND, 0);
              delay(1);
              GpioOut(LAN_COMMAND, 1);
              delay(1);
              GpioOut(LAN_COMMAND, 0);
              delay(1);
              GpioOut(LAN_COMMAND, 1);
              delay(1);
              GpioOut(LAN_COMMAND, 0);
              delay(1);
```

```
            GpioOut(LAN_COMMAND, 1);//      ____    ___    ____    ____
            delay(1);//                  __|1ms|__|1ms|__|1ms|__|1ms|__
            break;
}
//Command End: Set LAN_COMMAND and LAN_LOCK to low level
GpioOut(LAN_COMMAND, 0);
GpioOut(LAN_LOCK, 0);

//Save LAN Status to CMOS
SetStatusFlag(PairSel, PowerOn, PowerOff, WDT);

Return;
}
//---------------------------------------------------------------------------
void GpioInit(void)
{
char data;

outportb(ADDR_PORT, 0x87);
outportb(ADDR_PORT, 0x87);

//Select logical device 9
outportb(ADDR_PORT, 0x07);
outportb(DATA_PORT, 0x09);

//Enable GPIO_3 (Set bit 1=1)
outportb(ADDR_PORT, 0x30);
data = inportb(DATA_Port);
data = data | 0x02;
outportb(DATA_PORT, DATA);

//Disable SDA input, Disable SCL input (GP32.33.34) (Set bit1=0, bit2=1, bit3=1)
outportb(ADDR_PORT, 0x2A);
data = inportb(DATA_Port);
data = data & 0xFD;
data = data | 0x0C;
outportb(DATA_PORT, DATA);
```

```
//Enable GPIO_3 (GP32.33.34) (Set bit5.6.7=0)
outportb(ADDR_PORT, 0x2C);
data = inportb(DATA_Port);
data = data & 0x1F;
outportb(DATA_PORT, DATA);

//Initial GP0, GP1, GP4, GP5, GP6, GP7 pin status
outportb(ADDR_PORT, 0xF1);
data = inportb(DATA_Port);
data = data & 0x0C;
outportb(DATA_PORT, DATA);

//Set GP0, GP1, GP4, GP5, GP6, GP7 as output mode
outportb(ADDR_PORT, 0xF0);
data = inportb(DATA_Port);
data = data & 0x0C;
outportb(DATA_PORT, DATA);

outportb(ADDR_PORT, 0xAA);
}

//---------------------------------------------------------------------------
void GpioOut(char bit, char level)
{
    Char data;

    outportb(ADDR_PORT, 0x87);
    outportb(ADDR_PORT, 0x87);

    outportb(ADDR_PORT, 0xF1);
    data = inportb(DATA_PORT);
    if(Level == 1){
        SetBit(&data,Bit);
    }
    else {
        ClrBit(&data,Bit);
    }
    outportb(DATA_PORT, DATA);
```

```
    outportb(ADDR_PORT, 0xAA);
}
//---------------------------------------------------------------------------
void SetStatusFlag(char LANPair, char PowerON, char PowerOFF, char WDT)
{
    char data;

    switch(LANPair)
    {
    case 1:
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG1);
            data = inportb(CMOS_DATA_PORT);
            if(PowerON)  SetBit(&data, LAN1_PWRON_FLAG);
            else  ClrBit (&data, LAN1_PWRON_FLAG);
            if(PowerOFF) SetBit(&data, LAN1_PWROFF_FLAG);
            else  ClrBit (&data, LAN1_PWROFF_FLAG);
            if(WDT)  SetBit(&data, LAN_WDT_FLAG);
            else  ClrBit (&data, LAN_WDT_FLAG);
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG1);
            outportb(CMOS_DATA_PORT, data);
            break;
    case 2:
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG1);
            data = inportb(CMOS_DATA_PORT);
            if(PowerON)  SetBit(&data, LAN2_PWRON_FLAG);
            else  ClrBit (&data, LAN2_PWRON_FLAG);
            if(PowerOFF) SetBit(&data, LAN2_PWROFF_FLAG);
            else  ClrBit (&data, LAN2_PWROFF_FLAG);
            if(WDT)  SetBit(&data, LAN_WDT_FLAG);
            else  ClrBit (&data, LAN_WDT_FLAG);
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG1);
            outportb(CMOS_DATA_PORT, data);
            break;
    case 3:
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG1);
            data = inportb(CMOS_DATA_PORT);
            if(PowerON)  SetBit(&data, LAN3_PWRON_FLAG);
            else   ClrBit (&data, LAN3_PWRON_FLAG);
            if(PowerOFF) SetBit(&data, LAN3_PWROFF_FLAG);
```

```
            else   ClrBit (&data, LAN3_PWROFF_FLAG);
            if(WDT)   SetBit(&data, LAN_WDT_FLAG);
            else  ClrBit (&data, LAN_WDT_FLAG);
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG1);
            outportb(CMOS_DATA_PORT, data);
            break;
    case 4:
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG2);
            data = inportb(CMOS_DATA_PORT);
            if(PowerON)  SetBit(&data, LAN4_PWRON_FLAG);
            else  ClrBit (&data, LAN4_PWRON_FLAG);
            if(PowerOFF) SetBit(&data, LAN4_PWROFF_FLAG);
            else  ClrBit (&data, LAN4_PWROFF_FLAG);
            if(WDT)   SetBit(&data, LAN_WDT_FLAG);
            else  ClrBit (&data, LAN_WDT_FLAG);
            outportb(CMOS_INDX_PORT, LAN_STATUS_FLAG2);
            outportb(CMOS_DATA_PORT, data);
            break;
    }
}
//---------------------------------------------------------------------------
void SetBit (char *Data, char Bit)
{
    switch(Bit);
    {
          case 0:
                  *Data |= 0x01;
                  break;
          case 1:
                  *Data |= 0x02;
                  break;
          case 2:
                  *Data |= 0x04;
                  break;
          case 3:
                  *Data |= 0x08;
                  break;
          case 4:
                  *Data |= 0x10;
```

```
                break;
        case 5:
                *Data |= 0x20;
                break;
        case 6:
                *Data |= 0x40;
                break;
        case 7:
                *Data |= 0x80;
                break;
    }
}
//---------------------------------------------------------------------------
void ClrBit (char *Data, char Bit)
{
    switch(Bit);
    {
        case 0:
                *Data &= 0xFE;
                break;
        case 1:
                *Data &= 0xFD;
                break;
        case 2:
                *Data &= 0xFB;
                break;
        case 3:
                *Data &= 0xF7;
                break;
        case 4:
                *Data &= 0xEF;
                break;
        case 5:
                *Data &= 0xDF;
                break;
        case 6:
                *Data &= 0xBF;
                break;
        case 7:
```

```
                    *Data &= 0x7F;
                    break;
    }
}
```

5.3 WDT Sample Code

```
//---------------------------------------------------------------------

#include <stdio.h>

//---------------------------------------------------------------------
#define ADDR_PORT 0x2E
#define DATA_PORT 0x2F
//---------------------------------------------------------------------
void WdtInit(void);
void SetWdtTime(char);
char GetWdtTime(void);
void SetBit(char*, char);
void ClrBit(char*, char);

//---------------------------------------------------------------------
main(int argc, char *argv[])
{
int PairSel, PowerOn, PowerOff, WDT;
char count, data;

if(argc==2)
{
                    count = strtol(argv[1], NULL, 10);
}
else
{
                    printf("Command Error!!\n");
                    return;
}

WdtInit();
SetWdtTime(count);

while(1)
{
                    Data = GetWdtTime();
```

```
                    delay(100);
                    printf("\r Time Remaining: %d", data);
                    if(data==1) break;
}
delay(1000);
printf("\r Time Remaing: 0");
printf("\n Time Up!!\n");

WdtInit();
SetWdtTime(0);
return;
}
//---------------------------------------------------------------------------
void WdtInit(void)
{
char data;

outportb(ADDR_PORT, 0x87);
outportb(ADDR_PORT, 0x87);

//Set WDT Pin77 as WDTO#
outportb(ADDR_PORT, 0x2D);
data = inportb(DATA_PORT);
ClrBit(&data, 0);
outportb(DATA_PORT, data);

//Select LDN 8
outportb(ADDR_PORT, 0x07);
outportb(DATA_PORT, 0x08);

//Clear WDTO# Status bit
outportb(ADDR_PORT, 0xF7);
data = inportb(DATA_PORT);
ClrBit(&data, 4);
outportb(DATA_PORT, data);

//Enable Watch Dog Timer
outportb(ADDR_PORT, 0x30);
data = inportb(DATA_PORT);
```

```
SetBit(&data, 0);
outportb(DATA_PORT, data);

//Select Second Mode
outportb(ADDR_PORT, 0xF5);
data = inportb(DATA_PORT);
ClrBit(&data, 3);
outportb(DATA_PORT, data);

outportb(ADDR_PORT, 0xAA);
}
//-------------------------------------------------------------------------
void SetWdtTime(char count)
{
outportb(ADDR_PORT, 0x87);
outportb(ADDR_PORT, 0x87);

//Select LDN 8
outportb(ADDR_PORT, 0x07);
outportb(DATA_PORT, 0x08);

//Set Count
outportb(ADDR_PORT, 0xF6);
outportb(DATA_PORT, count);

outportb(ADDR_PORT, 0xAA);
}
//-------------------------------------------------------------------------
char GetWdtTime(void)
{
char data;

outportb(ADDR_PORT, 0x87);
outportb(ADDR_PORT, 0x87);

//Select LDN 8
outportb(ADDR_PORT, 0x07);
outportb(DATA_PORT, 0x08);
```

```
//Get Remaining Count
outportb(ADDR_PORT, 0xF6);
data = inportb(DATA_PORT);

outportb(ADDR_PORT, 0xAA);

return data;
}
//---------------------------------------------------------------------------
void SetBit(char *Data, char Bit)
{
    switch(Bit)
    {
                    case 0:
                              *Data |= 0x01;
                              break;
                    case 1:
                              *Data |= 0x02;
                              break;
                    case 2:
                              *Data |= 0x04;
                              break;
                    case 3:
                              *Data |= 0x08;
                              break;
                    case 4:
                              *Data |= 0x10;
                              break;
                    case 5:
                              *Data |= 0x20;
                              break;
                    case 6:
                              *Data |= 0x40;
                              break;
                    case 7:
                              *Data |= 0x80;
                              break;
    }
}
```

```
//---------------------------------------------------------------------------
void ClrBit(char *Data, char Bit)
{
    switch(Bit)
    {
                    case 0:
                              *Data |= 0xFE;
                              break;
                    case 1:
                              *Data |= 0xFD;
                              break;
                    case 2:
                              *Data |= 0xFB;
                              break;
                    case 3:
                              *Data |= 0xF7;
                              break;
                    case 4:
                              *Data |= 0xEF;
                              break;
                    case 5:
                              *Data |= 0xDF;
                              break;
                    case 6:
                              *Data |= 0xBF;
                              break;
                    case 7:
                              *Data |= 0x7F;
                              break;
    }
}
//---------------------------------------------------------------------------
```

Chapter 6

Q & A

Q: The power switch is pressed, but nothing happens.

A: Please check the following before you call out for help:

(1) Loose AC Power Cord => Push again.
(2) Loose power cable (both 24-pin and 4-pin) => Push again.
(3) A bad or loose power switch => Reseat the power switch on the header again.

Q: I can turn on the power, but the motherboard does not boot.

A: Please check the following before you call out for help:

(1) Unevenly populated memory modules on the slots => Re-populate the memory module again.
(2) Unevenly seated CPU on the socket => Reseat the CPU again.
(3) CMOS checksum error => Clear CMOS or reseat the CMOS battery again.
(4) Bad Hard Drive => Remove SATA signal cable or CompactFlash card and boot again.
(5) Bad PCI card or riser card => Remove PCI card and/or PCI riser card and boot again.
(6) Bad external devices => Detach RS-232 cable, LAN cable, and USB cable, and boot again.

Q: BIOS POST prompts but gets stuck.

A: Please check the following before you call out for help:

(1) CMOS checksum error due to Clear CMOS approach => Press F1 to bring up BIOS setup menu and load optimal setting.
(2) Bad Hard Drive => Remove SATA signal cable or CompactFlash card and boot again.
(3) Bad external devices => Detach RS-232 cable, LAN cable, and USB cable, and boot again.

Q: Power LED on power switch is not lit on

A: Please reseat the power switch and try again.

Q: HDD LED does not blink

A: Please reseat the HDD LED and try again.

Q: USB Keyboard does not work at DOS mode.

A: Please check the following before you call out for help:

(1) Check if USB keyboard is well plugged on USB port.
(2) Go to BIOS setup menu, Advanced/USB Configuration, and make sure Legacy USB Support is enabled.

Q: System does not boot from USB CD-ROM/DVD-ROM

A: Please check the following before you call out for help:

(1) USB CD-ROM/DVD-ROM is not plugged on USB port.
(2) Check in the BIOS that CD-ROM/DVD-ROM has not been detected.
(3) Check in the BIOS that CD-ROM/DVD-ROM has not been selected as the first boot device.
(4) Unadvised misuse: Some OS installation CD/DVDs, such as Microsoft Windows, have a few seconds waiting time for a keyboard press which triggers the system to boot from the CD-ROM/DVD-ROM. Otherwise, system would boot from internal Hard Drive.

Q: System does not boot from USB Pen Drive

A: Please check the following before you call out for help:

(1) USB Pen Drive is not well plugged on USB port.
(2) Check in the BIOS that USB Pen Drive has not been detected.
(3) Check in the BIOS that USB Pen Drive has not been selected as the first boot device.
(4) Make sure your USB Pen Drive comes with a firmware designed for booting.

Q: Windows-XP installer does not find any Hard Drive

A: Please check the following before you call out for help:

(1) Check in the BIOS that SATA Hard Drive or CompactFlash has been detected.
(2) Check in the BIOS for correct SATA mode. If AHCI or RAID mode is selected, please refer to Chapter 3 to load extra driver files.

Q: Windows does not boot straight forward, and keep rebooting itself or ends at a blue screen

A: Please check the following before you call out for help:

(1) Incorrect SATA mode => Change mode and boot again. In the case that you need to use a particular SATA mode which was not used for the installation, you need to reinstall your Windows.
(2) A wrong image file has been used for cloning.

Q: Windows boots, but shuts down prior to showing graphic mode

A: Please check the following before you call out for help:

(1) Power switch stays at a pressed-down position => bring it up or move it off the header.
(2) CPU cooler is not evenly placed on the top of CPU. Overheat issue => Reseat the cooler.
(3) No sufficient thermal grease is applied. Overheat issue => Add some more thermal paste.

Q: My Windows does not shuts down. It reboots in a few seconds after power off.

A: Please check the following before you call out for help:

(1) Press and hold the power switch for 4 seconds to see if your system shuts down permanently.
(2) Clear CMOS and try again.

Q: The display resolution is not right

A: Please change the resolution as follows (for Windows)

(1) Window-XP: Right-Click on the desktop and select Property for the configuration panel.
(2) Windows-7: Right-Click on the desktop and select Resolution for the configuration panel.

Q: I cannot connect my network with internet

A: Please consult your system administrator to confirm if a static network environment with security port designation has been deployed. Otherwise, mostly, reassuring to have Windows acquiring IP address automatically would be suggested and should resolve the situation. Please be referred to your system administrator for any further network configuration setting. Please also manage to confirm that Bypass function of the port (only applied to 4-Port RJ45 LAN module) in question is not enabled as this will interrupt the connector between RJ45 port and network chip.

Q: Can I enable Bypass function at Power Off mode?

A: Yes, you certainly can. NSP-2C20 comes with dual-latch relay that will work at both power on and power off mode. Please bring up the BIOS setup menu to for Bypass configuration.

Q: Can I use Console Port at BIOS mode?

A: Yes, you certainly can. NSP-2C20 comes with one console port as RJ45 at front side. Please manage to find the console cable in the accessory bag, add the RJ45 end to console port, and the other end to the DB9 RS-232 port of a Windows PC (for example, Windows-XP) that comes with terminal software (for example, Hyper Terminal). To start console function, please make sure console function is enabled, and a proper baud rate is selected. Also of great importance on the terminal software at Windows-PC, a correct serial port has been selected, and a baud rate at which NSP-2C20 has been configured is selected. Upon power on and bringing up BIOS menu, similar message will be popping on terminal pane.

Please be noted that no console message will be available on terminal pane out of BIOS (i.e., at run-time), unless user has managed to send console message over the console port by programming.

Q: My Windows does not see more than 4GB RAM

A: A 32-bit operating system captures only 4GB memory.

Q: 4GB RAM is installed, but Windows only sees around 3.0GB capacity.

A: Some portion of the system memory will be allocated for system devices, especially the onboard video device.

Q: Some onboard devices are not detected in Windows

A: Please check the following before you call out for help:

(1) Please go to Device Manager to rescan these devices if necessary.
(2) If any of the LAN port is not detected (4 of them should be all detected), please go to BIOS setup menu, Advanced/PCIE Ports Configuration, to see if any of them has been disabled.

Q: RS-232 Ports do not work

A: Please check the following before you call out for help:

(1) Please go to Device Manager to see if COM1/COM2 are correctly prompted.
(2) Please go to BIOS setup menu, Advanced/Super IO Configuration, to make sure RS-232 port(s) has(have) been enabled.
(3) Please double check your RS-232 cable for correct pin definition.